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TYPE STUDIES IN THE HYDNACEAE¹

III. THE GENUS SARCODON

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The name *Sarcodon* was first proposed by Quélet in Cooke and Quélet, *Clav. Syn. Hym. Eur.* 195. 1878, but as no binomials were formed the name was not established as a genus until later taken up by Karsten. Whether we follow Quélet or Karsten in our conception of the genus, the type species is *Hydnum imbricatum* L.

SARCODON RETICULATUS Banker, *Mem. Torrey Club* 12: 139. 1906
Hydnum fragile Fries, *Nya Svamp. in Ofvers. af Kongl. Vetensk. Ak. Forhandl.* 1851: 53. 1852; not *H. fragile* Persoon, *Syn. Meth. Fung.* 561. 1801.

The type of this species is "Copp 3716" deposited in the New York Botanical Garden herbarium. The specimen was collected in Iona, New Jersey, and is a part of the only collection of the species made in this country. Specimens of the plant sent to M. C. Cooke were referred by him to *Hydnum fragile* Fr. The Friesian name is untenable as it is preoccupied by *H. fragile* Pers. applied to a resupinate form. No type of *H. fragile* Fr. was found at Upsala, but European plants apparently identical with the American form are uniformly referred there to *H. fragile* Fr. At Kew specimens were found, collected in England, identical in every respect with the New Jersey plants even to the adherence of pine needles to the pileus indicating a similar habitat. At Upsala there was found a specimen collected at Mustiala, Finland, by P. A. Karsten, that had all the characters of our type except that it had a long somewhat fusiform stem, 2×8 cm., raising the pileus well up from the earth. This feature has not been observed in any other specimens.

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SARCODON ACRE Quélet, Ench. Fung. 188. 1886

Hydnum acre Quélet, Bull. Soc. Bot. France 24: 324. pl. 6. f. 1.
1877.

Hydnum cristatum Bres. Atkinson, Jour. Myc. 8: 119. 1902.

The type of *H. acre* Quélet has not been seen. A specimen, however, has been received from G. Bresadola which that eminent mycologist had compared with Quélet's type and regards as an authentic representative of the species. This specimen does not appear to me to differ in any respect from authentic specimens of *Hydnum cristatum* Bres., received from Professor George F. Atkinson, which are a part of the type collection. The acrid taste noted in both the European and the American plants confirms the diagnosis of their identity, as this character is not common in the Sarcodons. A specimen at Kew contributed by Quélet has all the characters of our American forms. There seems to be no good reason to maintain *H. cristatum* Bres. as a distinct species.

The plant appears to be most abundant in Connecticut and Long Island.

***Sarcodon radicans* sp. nov.**

Sarcodon fuligineo-violaceus Banker, Mem. Torrey Club 12: 142.
1906; not *Sarcodon fuligineo-violaceus* (Kalch.) Quélet. Ench.
Fung. 189. 1886.

Hymenophore terrestrial, mesopodous, gregarious, small, 3-4 cm. high, brownish; pileus subconvex, uneven, somewhat irregular, 4-6 cm. wide; margin thin, sterile, decurved; surface subpubescent to smooth, sometimes with small innate scales, light-brown or ochraceous-brown with darker areas; substance fleshy, somewhat tough, light-brown, lighter than the surface; stem subflexuose, somewhat inclined, excentric to central, solid, subeven, abruptly narrowing below to a slender root-like base, 2-2.5 cm. long, 1-1.5 cm. wide; teeth fine, terete, tapering, decurrent more or less scatteringly to the base, seal-brown to flesh color at the tips, when dry a uniform tawny-brown, short teeth scattered about among the long, 1.5-2 mm. long, 0.1-0.2 mm. wide, 9-12 to a square mm.; spores subglobose, tuberculate, 4-5.5 μ wide, brown; hyphae of trama hyaline, smooth, thin-walled, collapsing when dried, recovering slightly in KOH, forming an intricate tangle, scarcely separable in KOH, septate, without clamp-connections, segments irregular, more or less inflated, 9-12 μ wide, 40 μ or more long; taste mild; odor of slippery elm.

On earth in mixed woods, late summer and autumn, Schaghticoke, N. Y.

The type of the above described species is in the writer's herbarium from *Hydnum fuligineo-violaceum* Kalch., although Kalchbrenner's *Hydnum fuligineo-violaceum*, though not with entire confidence. Since then specimens have been received from Abbate G. Bresadola which that distinguished mycologist collected in Trient and compared with Kalchbrenner's type. These plants are manifestly very different from the American forms described above. At Upsala two specimens were observed collected in Hungary and contributed by Kalchbrenner himself. These plants appeared to have the characters of Bresadola's specimens, but were smaller, approaching in size the American plants. They confirmed the diagnosis that the above described species is distinct from *Hydnum fuligineo-violaceum* Kalch., although Kalchbrenner's figure² closely resembles the appearance of our plants.

SARCODON LAEVIGATUS (Sw.) P. A. Karsten, Rev. Myc. 3¹: 20. 1881

Hydnum laevigatum Sw. Kongl. Vetensk. Acad. Handl. 1810: 243. 1810.

Hydnum bubalinum Pers. Myc. Eur. 2: 161. 1825.

There is probably no type of *H. laevigatum* Sw. in existence. At least I have not been able to locate any of Swartz's specimens. In the European herbaria very little material was found referred to this species and none that could be regarded as having much weight in determining the authentic characters of the species. The American plants which we have referred to this species conform well to the few European plants that we have seen and appear to have all the characters ascribed to the species.

Hydnum bubalinum Pers. is represented in Persoon's herbarium at Leyden by a single specimen sent by Chaillet. The plant appears to be the same as our specimens of *H. laevigatum* Swartz.

SARCODON IMBRICATUS (L.) P. A. Karsten, Rev. Myc. 3¹: 20. 1881

Hydnum imbricatum L. Sp. Pl. 2: 1178. 1753.

Hydnum cervinum Pers. Obs. Myc. 1: 74. 1796.

² Kalchbrenner, Icon. Hym. Hung. pl. 32. f. 2.

There is of course no type of *H. imbricatum* L. in existence. At Upsala a number of specimens of European plants, mostly from Scandinavia and Finland, were found referred to this species by Fries, Karsten, and others. These were uniform in character and most closely resembled the large coarse-scaled American forms as figured by F. E. Clements, Minnesota Mushrooms 104. f. 69.

No type of *H. cervinum* Pers. was found at Leyden, but from the description the species does not appear to be distinct from *H. imbricatum* L. and was so regarded by Persoon himself, see Syn. Meth. Fung. 554.

Sarcodon Murrillii sp. nov.

Hymenophore terrestrial, mesopodous, medium to large size, reddish-brown; pileus expanded to infundibuliform, subrotund to irregular, 5–10 cm. wide, 1–2 mm. thick when dried; surface roughened with fine floccose scales, coarsest toward center, 1–2 mm. wide, ends upturned, about as long as wide, subzonately arranged, dark-reddish-brown on scales, lighter between; margin thin, fertile, repand, finely lobed or crenate, pallid; substance fleshy, pale-brown to whitish, drying thin, but somewhat tough and flexible; stem subcentral, strongly inclined, tapering gradually and then abruptly to the base, reddish-brown above, concolorous with pileus, paler below but becoming blackish at the base, scabrous roughened nearly to the base, apparently hollow or stuffed, 4–6 cm. long, 1–2 cm. wide; teeth small, slender, terete, tapering, acute, crowded, decurrent nearly to the base, reddish-brown, white tipped, 1.5 mm. or less long in dried plant, 0.15–0.25 mm. wide, 9–12 to a square mm.; spores subglobose, tuberculate, tubercles not prominent, pale-brownish, 6–7 μ wide; basidia prominent, irregular, clavate, 8–10 μ wide; sterigmata conical, curved, horn-shaped, 3–4 μ long; hyphae of trama hyaline, smooth, thin-walled, collapsing when dried, recovering in KOH, subparallel but partly separable in KOH, septate, without clamp-connections, segments short, stout, constricted at the septa, irregular, 10–28 μ wide by 20–70 μ long; hyphae of the teeth very slender, tubular, rarely septate, 3–4 μ wide.

The type of the species is *Murrill and House 397*, Transylvania, North Carolina, deposited at the New York Botanical Garden.

Many of the specimens distributed in Ellis, N. Am. Fung., "926 *Hydnum imbricatum*" are undoubtedly this species. I know that some of them are.

Sarcodon fumosus sp. nov.

Hymenophore terrestrial, mesopodous, small, 3–5 cm. high, ash-gray to smoky; pileus plane to convex, 2–3 cm. wide, 2–3 mm. thick; surface even, subpubescent, ash-gray to smoky-olivaceous-brown when dried; margin thin, fertile, minutely serrate; substance fleshy-spongy when fresh, somewhat tough, flexible, compact, subwaxy toward surface, soft fibrous within, olivaceous, when dried; stem slender, subcentral, inclined or curved, attenuate upward, subpubescent at base to glabrous shining toward the cap, 2–4 cm. long, 3–10 mm. wide; teeth short, slender, terete, tapering, acute, uneven, not decurrent, pale to dirty-white, somewhat crowded, 2–5 mm. long or less, 0.2–0.4 mm. wide, 9–12 to a square mm.; spores dark, coarsely and densely tuberculate, ovoid, $7-9\mu \times 9-11\mu$ wide; basidia clavate to oblong, narrowing abruptly at the base, $7-10\mu$ wide by $25-30\mu$ long; sterigmata delicate, conical, incurved, $3-4\mu$ long; hyphae of trama colored, dissolving out freely in KOH, becoming hyaline, slender, smooth, thin-walled, collapsing when dried, recovering slightly in KOH, forming an intricate tangle but slightly separable in KOH, septate without clamp-connections, segments extremely long, somewhat irregular, more or less constricted at the septa, $4-6\mu$ wide; hyphae of the teeth very slender, parallel, $3-4\mu$ wide; taste bitterish.

The type of the species is *Murrill and House 394*, North Carolina, deposited at the New York Botanical Garden.

Sarcodon roseolus sp. nov.

Hymenophore terrestrial, mesopodous, gregarious, small to medium size, 4–6 cm. high, pale-rose-color; pileus plane to convex, 3–4 cm. wide, 0.5 cm. or less thick; surface pubescent and slightly imbricate, scaly, even, whitish tinged with old-rose; margin thin, incurved when dried; substance fleshy-tough, drying into two layers, an inner waxy or gummy, subtranslucent layer, and an outer dry, opaque, subfibrous layer; stem slender, subcentral, strongly inclined, subeven, slightly radicate, scabrous, 2–3 cm. long by 7–10 mm. wide; teeth very short, terete, tapering, acute, uniform, decurrent and abortive on the stem, not crowded, 0.3–0.7 mm. long by 0.1–0.2 mm. wide, 16–20 to a square mm.; spores pale-brown, tuberculate, ovoid, $4-5 \times 5-6\mu$ wide; basidia clavate, four-spored, $5-6\mu$ wide; sterigmata slender, capillary, 3μ long; hyphae of inner portion of pileus clouded, smooth, slender, thin-walled, collapsing when dried, recovering in water and KOH, forming a somewhat intricate and compact tangle, scarcely sepa-

nable in KOH, septate, without clamp-connections, segments long, irregular, subtubular, 4-7 μ wide, contents granular; hyphae of outer portion of pileus more even, tubular, and coiled.

The type of this species is *Murrill and House 392*, North Carolina, in New York Botanical Garden. No other specimens are known.

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